



HQ AFSPC
Space Superiority Through
Space Control

Brig Gen (S) J. Gregory Pavlovich
Deputy Director of Operations
HQ Air Force Space Command



“We know from history that every medium--air, land and sea--has seen conflict. Reality indicates that space will be no different. Given this virtual certainty, the U.S. must develop the means both to deter and defend against hostile acts in and from space.”

(Commission to Assess United States National Security Space Management and Organization, 11 Jan 2001)



Overview

- **Why do we care?**



Overview

- **Why do we care?**

“The present extent of U.S. dependence on space, the rapid pace at which this dependence is increasing, and the vulnerabilities it creates, all demand that U.S. National security space interests be recognized as a top national security priority.”

(Commission to Assess United States National Security Space Management and Organization,
11 Jan 2001)



Space Contributions to the Economy

- **Over 900 active satellites (300+ US satellites)**
- **20% annual growth during the last seven years**
- **\$0.5 trillion spent on space from 1996 to 2000**
- **1996: Commercial space revenues surpassed government space expenditures**
 - **53% commercial; 47% government**



Space Contributions to the Military

COMMUNICATIONS

DSCS
UFO/FLTSAT
MILSTAR
COMMERCIAL

EARLY WARNING

DSP

GPS NUDET SUBSYSTEM

NAVIGATION

TRANSIT
GPS

WEATHER

DMSP
NOAA, EUMETSAT

USERS

CINCS

Theater Commanders
Ground Forces (Special Forces,
Recon Units, FACs, & SAR)
Naval Forces

Theater Commanders
Ground Forces
Patriot Batteries
Civilians

Naval Forces
Ground Forces (Special Forces, Armored
& Artillery Units, & SAR)
Precision Weapons
Airborne Forces

Ground Forces
Naval Forces
Special Forces



Space Contributions to the Military

- **Growing US military dependence on space information**
 - **Kosovo: 150% increase in SATCOM usage over Gulf war levels**
 - **Persian Gulf: 10X larger force than Kosovo**

“Space support was instrumental to our success. Reliance on space continues to grow in our military operations.”

-Kosovo After Action Report



National and DoD Policy

- **“...[assure] that hostile forces cannot prevent our own use of space.” (National Space Policy, PDD-NSC-49 / NTSC-8, 14 Sep 96)**
- **“Space capabilities shall be operated and employed to: assure access to and use of space; deter, and, if necessary, defend against hostile actions; ensure hostile forces cannot prevent U.S. use of space...” (DOD Space Policy, DOD 3100.10, 9 Jul 99)**

Overview



- **Why do we care?**
- **What do we do about it?**



Overview

- **Why do we care?**
- **What do we do about it?**

Achieve Space Superiority!



Overview

- **Why do we care?**
- **What do we do about it?**

Achieve Space Superiority!

“.....domination of space allowing US forces to conduct operations at a given time or place without prohibitive interference from adversary forces.”

-AFDD 2-2



Overview

- **Why do we care?**
- **What are we doing about it?**
- **How do we get there?**



Overview

- **Why do we care?**
- **What are we doing about it?**
- **How do we get there?**

Space Control!



AF Doctrine 2-2 (Space Control)

Space Control

Means by which space superiority is gained and maintained to assure US and friendly forces can use the space environment while denying its use to the enemy



A large blue arrow points from the "Space Control" box down to a bracket that groups three sub-components: "Space Situational Awareness", "Defensive Counterspace", and "Offensive Counterspace".

Space Situational Awareness

Defensive Counterspace

Offensive Counterspace



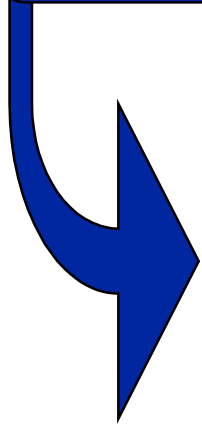
AFSPC Space Control Progress

- **Organizing to meet emerging Space Control Requirements**
- **Committing Resources**
- **Addressing Doctrine and Policy**
- **Challenging legal and political paradigms**



AF Doctrine 2-2 (Space Situational Awareness)

Space Situational Awareness



**Space Surveillance, Space Environment Sensing,
Space Intelligence and Space Reconnaissance**

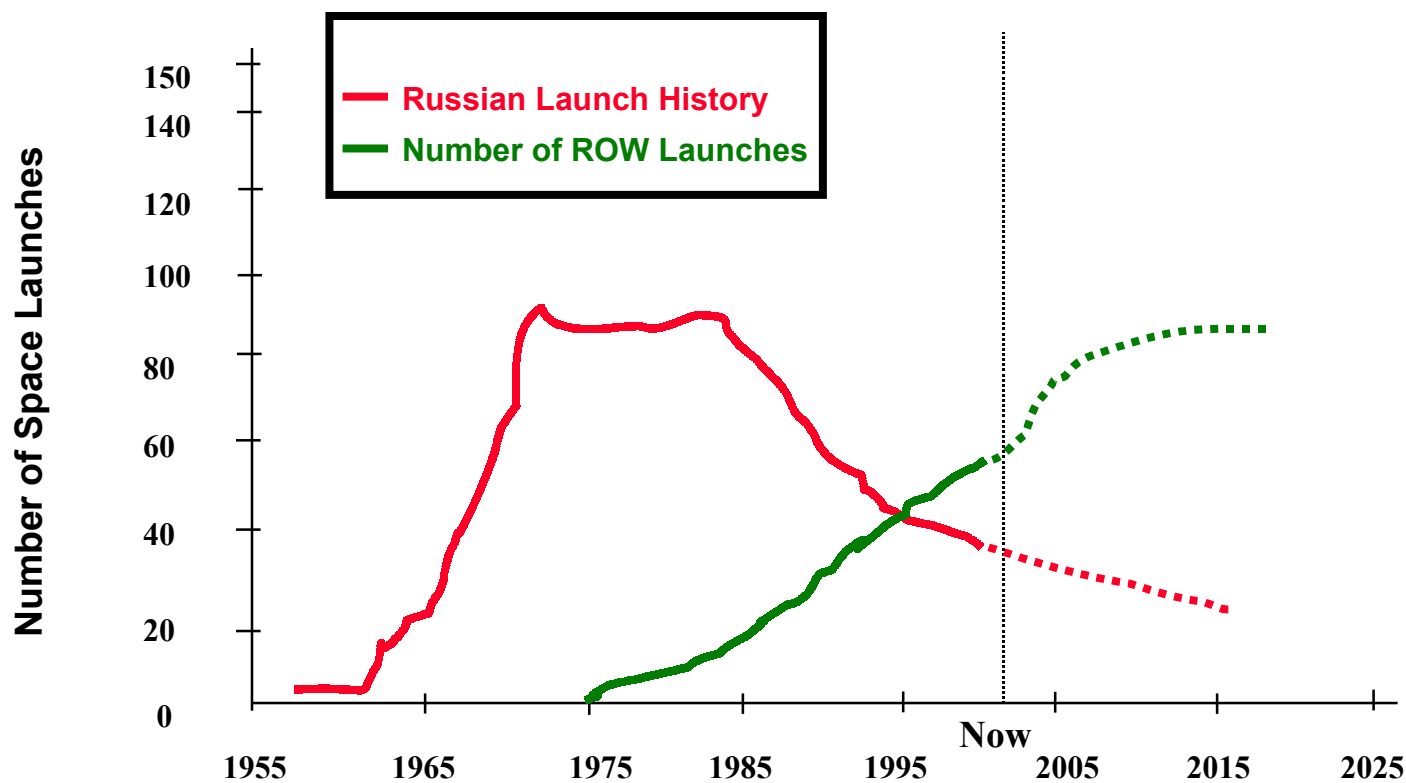
"Space situational awareness forms the foundation for counterspace operations."

(AFDD 2-2, Sep 00)



Challenges to Situational Awareness

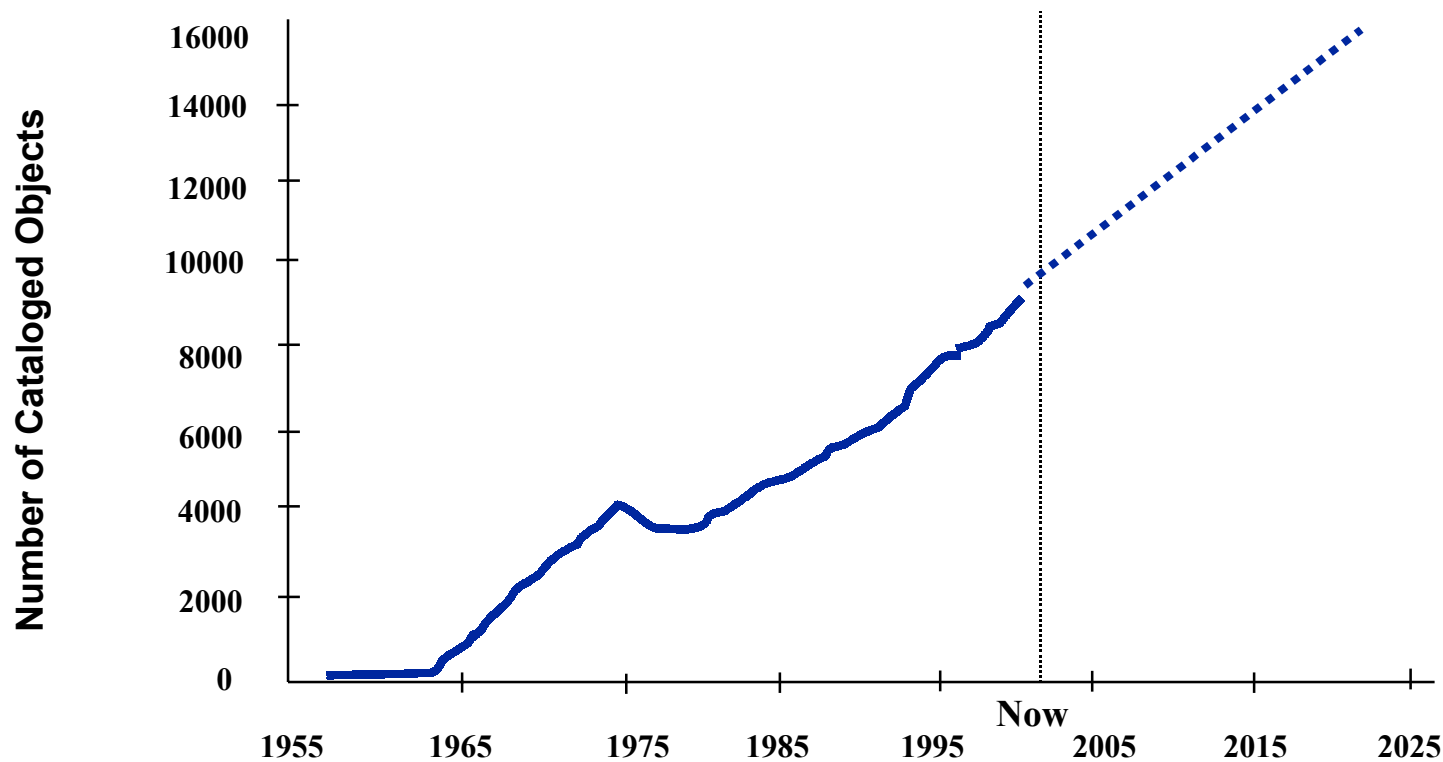
Launch History





Challenges to Situational Awareness

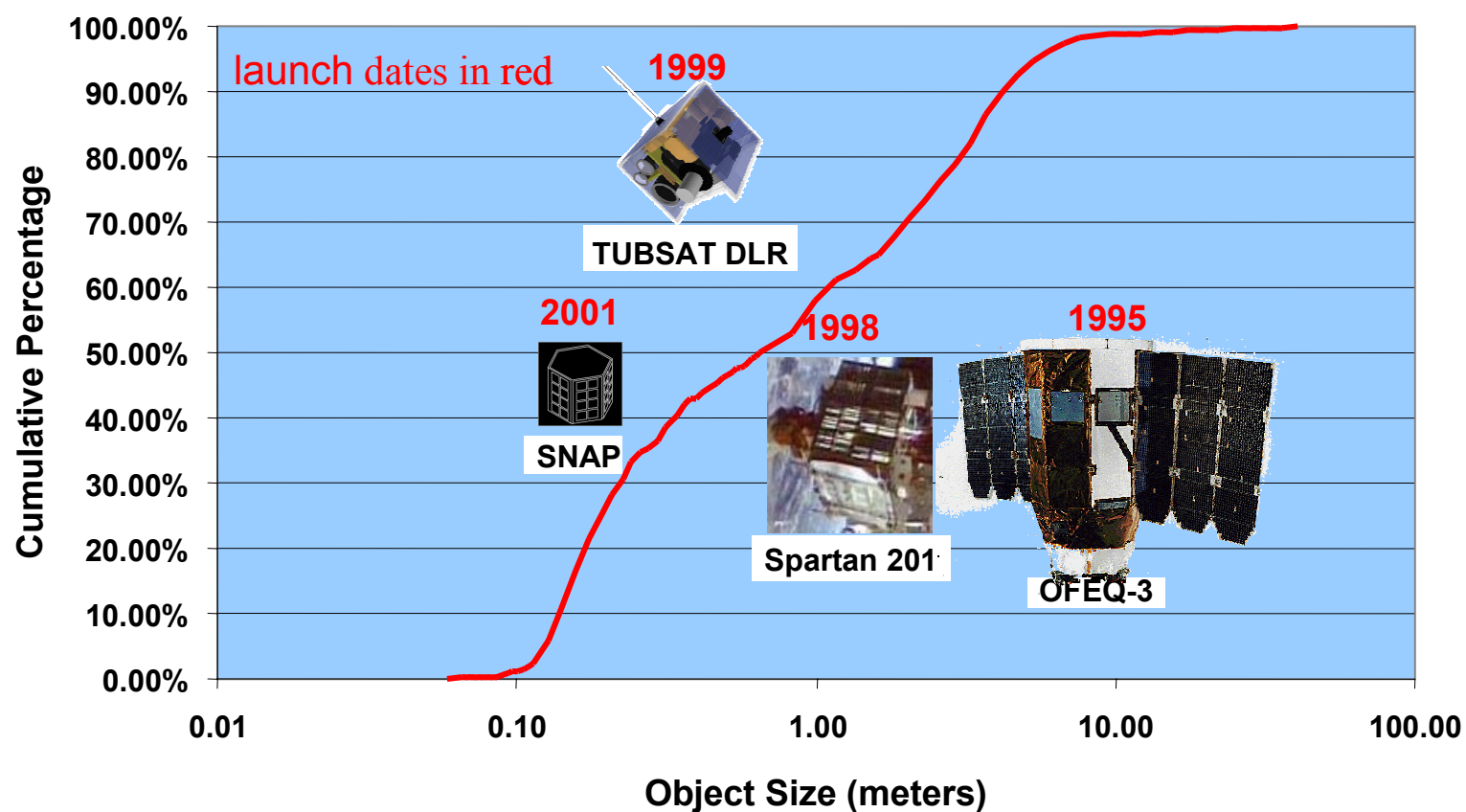
Catalog Growth





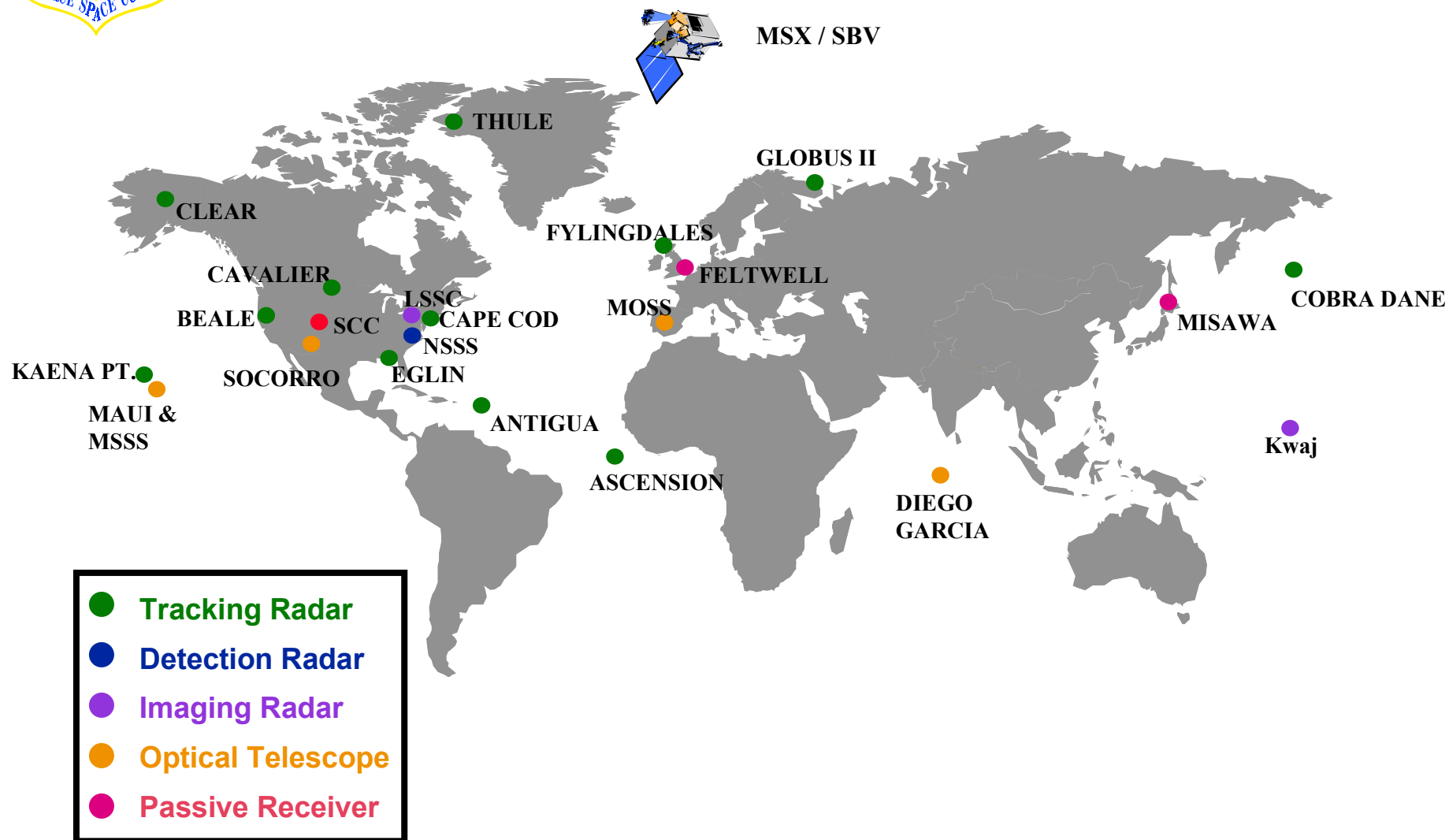
Challenges to Situational Awareness

Catalog Cumulative "Size" Distribution





Space Surveillance Activities





Space Surveillance Way Ahead

- **Attain a sustainable, interoperable, normalized SSN that meets documented space control requirements**
 - **Integrate Command and Control systems**
 - **Upgrade sensors to improve capability**
 - **Ensure adequate surveillance sensor coverage**
- **Migrate from Surveillance to Situational Awareness**



AF Doctrine 2-2 (Defensive Counterspace)

Defensive Counterspace

Active

Detect, track, identify, intercept, and destroy enemy threats to friendly space capabilities

Passive

Reduce vulnerabilities, protect and increase survivability of friendly space forces and the information they provide

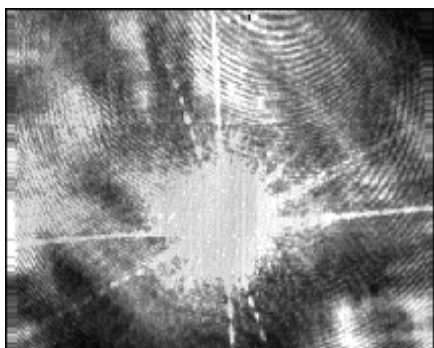
***AFSPC Strategic Master Plan #1 Need --
“Protect Friendly Space Capabilities”***



Scope of DCS Mission

Intentional Man-made Threats against

Spacecraft



Link



& Ground Elements



Why do space systems need protection?

- **MED-TV**, a Kurdish channel which beams programs to 70 countries, is jammed by **Turkey** from a ship [25 Nov 98 Washington Post report]
- **Iran's** ruling theocracy jams satellite broadcasts of Simay-e Moghavemat on AsiaSAT and ArabSAT [12 Aug 97 report from the Secretariat of the National Council of Resistance of Iran]
- **Indonesia** jams Tonga's C-Band ComSat during a dispute over an orbital slot [27 Feb 97 News Brief]
- A **Russian** jamming device that can knock out satellite navigation system signals has been actively marketed to numerous countries [7 Apr 98 Federal Computer Week report]

“The political, economic and military value of space systems makes them attractive targets.”

**(Commission to assess US National Security
Space Management and Organization, Jan 2001)**



Defensive Counterspace Initiatives

- **527th Space Aggressor Squadron**
 - Improve training, exercises, procedures and doctrine
- **Guide protection requirements for existing and future programs**
- **Develop Attack Detection, Characterization and Reporting System**

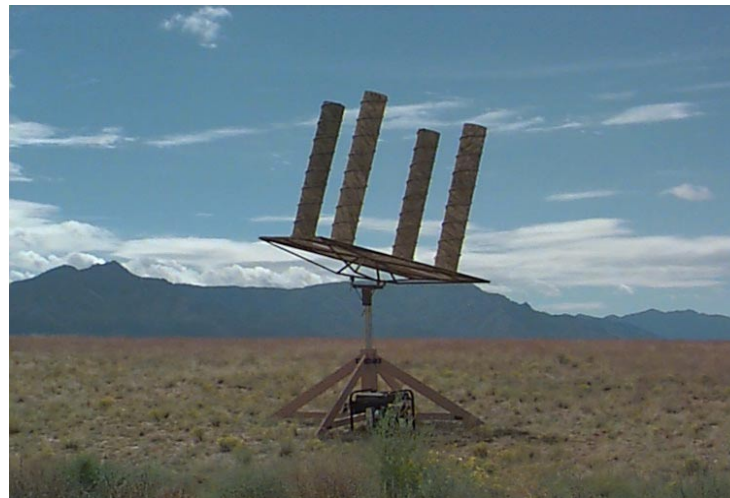


Space Aggressor Squadron

- **Realistic Adversary**
 - **SATCOM Denial**
 - **GPS Jamming**
- **Critical Impact to the AEF**



COTS EQUIPMENT





Defensive Counterspace 2010 End-State

For each end-to-end space capability, an effective and affordable level of protection based on the most appropriate combination of the following attributes...

- **CONTROLLED KNOWLEDGE**
 - Prevent adversary from knowing what, when, and how to attack
- **DETERENCE**
 - Deter adversary from choosing to attack
- **THREAT DETECTION/REPORTING**
 - Unambiguous detection and rapid geolocation of attack
- **SURVIVABILITY**
 - Prevent attack from affecting the user's mission
- **RAPID RECOVERY**
 - Rapid recovery from an attack



AF Doctrine 2-2 (Offensive Counterspace)

Offensive Counterspace

Deception -- Mislead the adversary by manipulation, distortion, or falsification of evidence

Disruption -- Temporary impairment of the utility of space systems, usually without physical damage

Denial -- Temporary elimination of the utility of space systems, usually without physical damage.

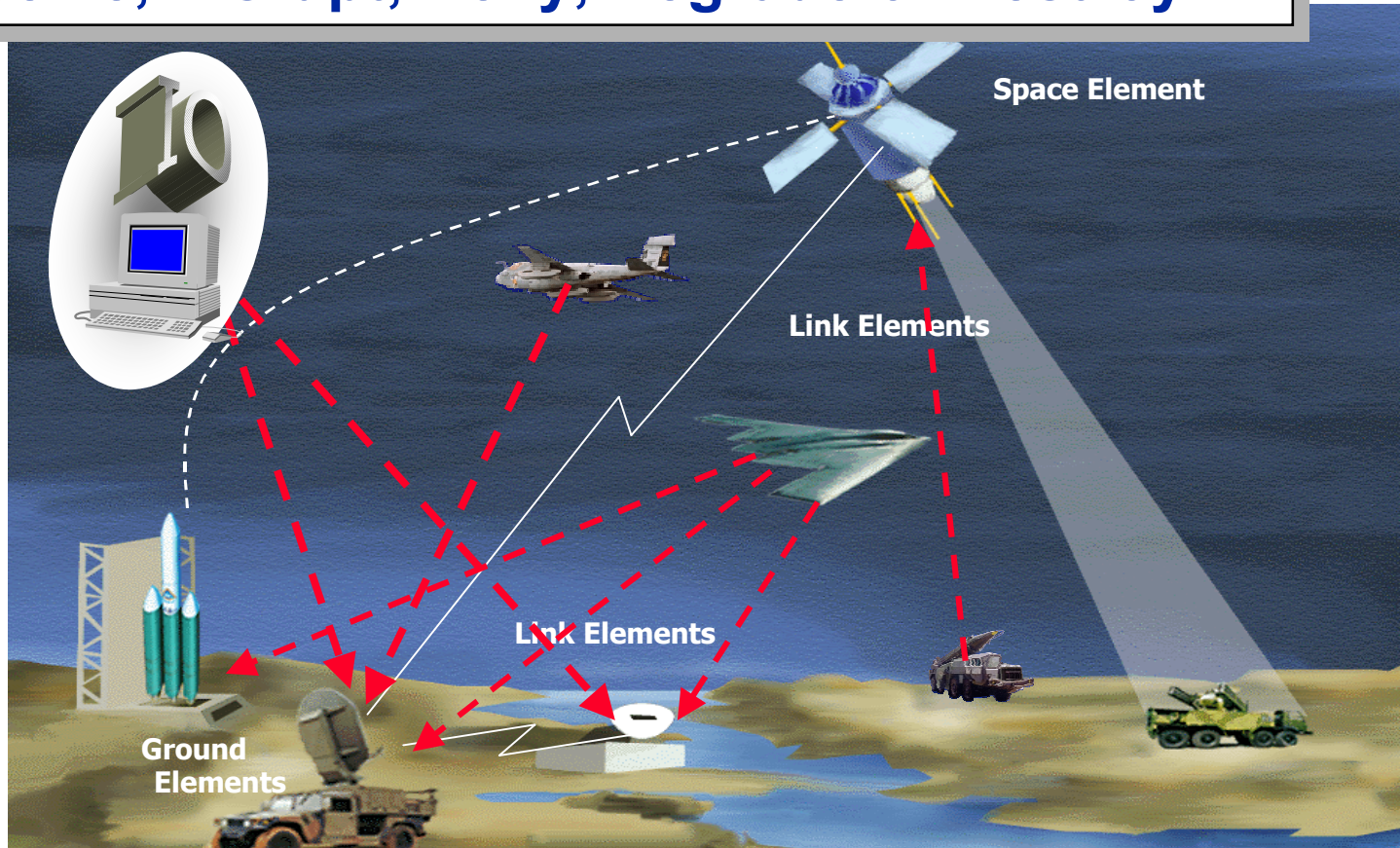
Degradation -- Permanent impairment of the utility of space systems, usually with physical damage.

Destruction -- Permanent elimination of the utility of space systems, usually with physical damage.



Scope of Offensive Counterspace Mission

Deceive, Disrupt, Deny, Degrade or Destroy. . .



Adversary Spacecraft, Link & Ground Elements



Offensive Counterspace Activities

- **Identify and define the requirement for OCS**
 - **Develop Offensive Space Control CONOPS**
 - **Develop C2 CONOPS for potential OCS systems**
- **76th Space Control Squadron**
 - **Prototype counterspace technologies for demonstration**
- **Exercise, experiment with, and wargame OCS technologies**



Offensive Counterspace 2010 End-State

Full Spectrum Space Control

- **Counter Satellite Communications Capability**
- **Counter Surveillance/Reconnaissance Capability**
- **Theater Executable Systems**
- **OCS forces normalized within the AEF**



Counterspace Challenges

- **Challenging legal and political paradigms**
- **Defining requirements**
- **Determining Military Utility**
- **Identifying Resources**
- **Fielding Systems**
- **Documenting and normalizing processes**

***Shifting the space mission from
support to **COMBAT*****



Conclusion

“.....This will require superior space capabilities. Thus far, the broad outline of U.S. national space policy is sound, but the U.S. has not yet taken the steps necessary to develop the needed capabilities and to maintain and ensure continuing superiority.”